UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/989,179	11/21/2001	Michiharu Aratani	2975.0008	9420

5514 7590 12/01/2005

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
LAM, HUNG H	

ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 12/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/989,179	ARATANI ET AL.	
	Examiner	Art Unit	
	Hung H. Lam	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/01/05*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-10,13,15 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-10,13,15 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/01/05 has been entered.

Response to Arguments

2. Applicant's arguments, see remark page 6, filed 10/03/05, with respect to the rejection(s) of claim(s) 1, 2, 4-10, 13, 15 and 16 under Levecq have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Sugimoto.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 4-10, 13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levecq (US-6,392,755) in view of Sugimoto (US-6,281,034).

With regarding to **claim 1**, Levecq discloses a compound eye imaging system comprising:

at least three optical blocks (Col. 4, Ln. 14-35), and

an imaging element for picking up object images formed by the optical blocks in imaging ranges provided for each optical block (Col. 3, Ln. 55-67),

wherein optical axes of the optical blocks intersect each other (Fig. 2; one of the optical axes 9 and 10 of the optical system 10 is intersected each other at object 4), and

the compound eye image system measures the distance to an object based on outputs from a pair of image ranges in the imaging element, which correspond to any one pair of the at least three optical blocks (Col. 2, Ln. 14-30; Col. 5, Ln. 49-67; Col. 6, Ln. 1-26; the accuracy of the calculating distance from the light source to the device depends on the number of used spot).

However, Levecq fails to explicitly disclose a shielding member which prevents light from each optical block from reaching an imaging range other than the imaging range corresponding to each optical block.

In the same field of endeavor, Sugimoto teaches a solid state imaging device wherein the light shielding film (Fig. 1; light shielding 6) comprises the first (11) and second films (12) layer structure (Col. 4, Ln. 8-29). Sugimoto further teaches that the light-shielding film may be made sufficiently thick even in the side wall of the step, thereby making it possible to satisfactorily suppress light from passing the light-shielding film to other light receiving portions (Fig. 1; light

receiving portion 2; Col. 4, Ln.30-35). In addition, Sugimoto teaches that the thickness of the light-shielding film may be reduced without increasing the light passing through the light-shielding, thereby preventing a sensitivity from being lowered, a smear from increasing as the size of the pixel is reduced and an image quality from being deteriorated as a sensitivity become fluctuated (Col. 4, Ln. 46-57). In light of the teaching from Sugimoto, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Levecq by having the double layer light-shielding structure of Sugimoto in order to prevent light from passing the light-shielding film to other light-receiving portions. The modification thus provide an improved solid state imaging device that prevents an image quality from being deteriorated as a sensitivity become fluctuated (Sugimoto: Col. 4, Ln. 46-57).

With regarding to **claim 2**, Levecq in view of Sugimoto discloses a compound eye imaging system wherein all the optical axes of the optical blocks roughly intersect each other at one point (Levecq: Fig. 2; optical axes 9, 10 and other are intersected at object 4).

With regarding to **claim 4**, Levecq in view of Sugimoto discloses a compound eye imaging system wherein a plurality of imaging blocks, which comprise the imaging ranges that are different from each other, are formed in the imaging element (Levecq: Col. 3, Ln. 47-67; Levecq teaches that a 28 mm CCD array comprises a plurality of imaging blocks wherein each imaging block corresponds to about 20 elementary detectors on the detector 7; it is inherent that each of the imaging block/ 20 elementary detectors is distanced from one another and captured different part of the object that are formed on the detector 7).

With regarding to **claim 5**, Levecq in view of Sugimoto discloses a compound eye imaging system wherein the imaging element is constructed so that the plurality of imaging blocks are formed on a single substrate (Levecq: Col. 3, Ln. 36-46; Col. 3, Ln. 57-64; see the structure of the detector 4 or CCD array on Fig. 2).

With regarding to **claim 6**, Levecq in view of Sugimoto discloses a compound eye imaging system wherein the imaging element is constructed by forming the plurality of imaging blocks on a single semiconductor substrate (Levecq: Col. 3, Ln. 57-64; see the structure of the detector 4 or CCD array on Fig. 2; the imaging blocks with the total of 2048 elementary detectors {20 elementary detector for each block} must be formed on a single semiconductor substrate which is commonly use in the art).

With regarding to **claim 7**, Levecq in view of Sugimoto discloses a compound eye imaging system wherein the optical blocks are unified (Levecq: Col. 4, Ln. 15-27; it is noticed that the plural of optical blocks are unified to form the micro-lenses).

With regarding to **claim 8**, Levecq in view of Sugimoto discloses a compound eye imaging system further comprising optical action surfaces comprising the optical blocks wherein at least one of the optical action surfaces has an aspherical shape (Levecq: Col. 4, Ln. 28-30; aspherical micro-lenses must be formed on the basis of aspherical shape).

With regarding to **claim 9**, Levecq in view of Sugimoto discloses discloses a compound eye imaging system wherein an optical action surface comprising at least one of the optical blocks has a rotational asymmetric aspherical shape (Levecq: Fig. 2; Col. 4, Ln. 28-30; the central optical block corresponding to optical axes 9 is interpreted as the optical block having a rotational asymmetric spherical shape).

With regarding to **claim 10**, Levecq in view of Sugimoto discloses a compound eye imaging system wherein at least one of the optical action surfaces comprising the optical blocks is a diffraction action surface (Levecq: Col. 5, Ln. 64-67 – Col. 4, Ln. 1; it is inherent that the micro-lenses include a diffraction action surface because the 10 mm focal length is chosen so that the profile of the light spots remains within the diffraction limit of about 50μm).

With regarding to **claim 13**, Levecq in view of Sugimoto discloses an imaging device wherein an average value of distances to an object is measured based on outputs from multiple pairs of imaging ranges for picking-up an image of the object through multiple pairs of optical blocks in the imaging element (Levecq: in Col. 2, Ln. 20-30, Levecq teaches that the more spots are used for calculating the distance to the object the higher the accuracy is; in Col. 5, Ln. 49-67, Levecq teaches that the value of distance to an object is calculated based on the average separation between two successive spots; in Col. 3, Ln. 43-45, Levecq teaches that each spot being spread over at least two elementary detector {a pair of imaging range}. Therefore, the value of the distance to an object is based on the average calculation of two or more successive spot {each spot covers over 2 elementary detector}).

With regarding to **claim 15**, Levecq in view of Sugimoto discloses electronic equipment comprising the compound eye imaging system (Levecq: Fig. 3; optical system 10, CCD array 7; Col. 3, Ln. 47-67 – Col. 4, Ln. 1-40).

With regarding to **claim 16**, Levecq in view of Sugimoto discloses a compound eye imaging system, comprising:

a plurality of optical blocks (Levecq: Col. 4, Ln. 14-35), and

an imaging element for picking-up object images formed by the optical blocks in imaging ranges provided for each optical block (Levecq: Col. 3, Ln. 55-67),

wherein optical axes of the optical blocks intersect each other on the object side (Levecq: Fig. 2; one of the optical axes 9 and 10 of the optical system 10 is intersected each other at object 4), and

each imaging range corresponding to each optical block in the imaging element is formed on a single semiconductor substrate (Levecq: Col. 3, Ln. 57-64; see the structure of the detector 4 or CCD array on Fig. 2; the imaging blocks with the total of 2048 elementary detectors {20 elementary detector for each block} must be formed on a single semiconductor substrate which is commonly use in the art).

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Ueno (2001/0054743) disclose a solid state imaging device wherein the light receiving portion will not be intercepted by the light shielding film.

b) Kochi (US-6,188,094) discloses an image pickup device wherein a metal layer functions as light-shielding device.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung H. Lam whose telephone number is 571-272-7367. The examiner can normally be reached on Monday - Friday 8AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's primary, David Ometz can be reached on 571-272-7593. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HL

06/18/05

DAVID OMETZ
SUPERVISORY PATENT EXAMINER